

# On guidance and volatility

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**On guidance and volatility**

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# On Guidance and Volatility

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## Abstract

Survey evidence suggests that managers voluntarily disclose information, particularly earnings guidance, with an aim toward dampening share price volatility. Yet, consultants and influential institutions advise against providing guidance — citing fears of litigation and market penalties associated with missed earnings targets, as well as a lack of evidence that disclosure actually curbs volatility. Furthermore, recent research links guidance to increased volatility and heightened crash risk. Hence, many argue that guidance not only fails to promote tranquility but may actually prompt turbulence. In this paper, we consider the interplay between guidance and volatility. Consistent with the notion that volatility does indeed factor into managers' decisions to supply earnings guidance, we provide evidence of a link between increased volatility and the likelihood that a manager chooses to “bundle” a forecast with the firm's earnings announcement in the current quarter. In particular, our findings indicate that firms in more volatile information environments exhibit a general reticence to offer guidance, but given a recent spike in volatility, managers are more likely to jump in with a forecast seemingly in an effort to calm the market. Subsequent tests indicate that managers' efforts do not go unrewarded, as we document a greater post-announcement run-down in volatility for guiding firms. Taken collectively, this evidence supports the view that managers can and do positively shape their firms' information environments by an earnings guidance.

**Keywords:** disclosure; earnings guidance; volatility

**JEL Classification:** M41; K22; G14

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## **1. Introduction**

No managerial communication arouses such negative reaction, even furty, as earnings guidance does. In 2006, the prestigious Conference Board urged managers to stop issuing quarterly guidance because it encourages a short-term focus, detrimental to firms' ability manage for the long-term ("Revising Stock Market Short-Termism," 2006). Also in 2006, the CFA Institute in conjunction with the Business Roundtable, in a dramatic "Call for Action," implored managers to "End the practice of providing quarterly guidance," because it's an "unproductive and wasted effort by corporations...,and causes...neglect of long-term business growth..." In 2007, a bipartisan commission established by the U.S. Chamber of Commerce also called for the end of the earnings guidance practice, to be substituted by an explanation of the firm's long-term goals and strategies (The Commission on the regulation of U.S. Capital Markets in the 21<sup>st</sup> Century, 2007).

Not to be left behind, the leading consulting company McKinney made its view about guidance clear in a report to clients: "The Misguided Practice of Earnings Guidance." (2006), claiming that guidance doesn't provide any economic benefit, including the tampering of share volatility. Warren Buffett publicly voiced his antagonism to guidance; Google's founders declared at the IPO that the search firm will not guide; and even Al Gore urged managers to cease guiding investors. And the list of guidance bashers goes on.

While the frequency of quarterly guidance decreased by about 30% in 2007-2008, mainly due to difficulties to predict firm performance during the financial crisis and the ensuing recession, close to 800 public companies still regularly provide quarterly guidance and about 1,800 companies provide annual and/or quarterly guidance, out of roughly 5,500 U.S. public companies—clearly, a substantial number of guiders. Apparently, guiders do benefit from the

practice. But what exactly are those benefits? We focus in this study on a major potential benefit—reducing share volatility.

Managers often express concern with excessive share volatility and survey evidence indicates that managers voluntarily disclose information aimed at dampening share price volatility (Graham, Harvey, and Rajgopal 2005; McKinsey survey 2006). Indeed, executives frequently claim that they provide earnings guidance in order to reduce the volatility of their stock (Johnson 2009; National Investor Relations Institute 2009). In contrast to managers' claims, some work links guidance with *increased* volatility and heightened crash risk (Rogers, Skinner and Van Buskirk 2009; Hamm, Li and Ng 2012), while other work suggests that opportunistic managers provide guidance in an intentional effort to foster uncertainty in order to enhance stock option gains (So 2012). Hence, recent research argues that guidance not only fails to promote tranquility but may actually prompt turbulence. The stage is thus set for a comprehensive examination of the relation between quarterly earnings guidance and share volatility.

In this paper, we consider the interplay between guidance and volatility. We provide evidence of a link between increased volatility and the likelihood that managers choose to “bundle” a forecast with the firm's earnings announcement. In general, we observe a negative relation between the level of share volatility and the incidence of guidance, that is, volatile firms guide less frequently, presumably because they find it harder to predict future performance. However, the relation between volatility and guidance turns positive when there is a pre-earnings announcement run-up in volatility. Thus, a spike in volatility triggers the choice to bundle a forecast with the earnings release, presumably, reflecting managers' efforts to quiet the turmoil in the stock. Inconsistent with prior research which suggests that guidance actually fuels

volatility, we find no evidence that the decision to guide in a given quarter enhances volatility. Indeed, we document the opposite: guidance-earnings bundling is associated with a larger reduction in volatility in the days following the announcement of earnings than non-bundled earnings releases.

Our analyses examine a sample of 107,307 quarterly earnings announcements that were made in the decade since Regulation Fair Disclosure (“Reg FD”) took effect in October of 2000. In line with recent findings, we note that over 30% (32,910) of those announcements coincide with the issuance of forward-looking, bundled earnings guidance (Anilowski, Feng and Skinner 2007; Rogers and Van Buskirk 2012). In our empirical tests, we compare the volatility dynamics surrounding the quarterly earnings announcements bundled with guidance to earnings announcements without guidance (i.e., bundled versus nonbundled earnings announcements). Evidence indicates that increasingly guidance is provided with the earnings announcement (Anilowski, Feng and Skinner, 2007; Rogers and Van Buskirk, 2012). Our focus in this study on bundled guidance thus covers the large majority of guidance cases in practice.

Our finding that a volatility runup prior to the earnings announcements leads to guidance-earnings bundling holds after controlling for known determinants of bundled guidance—most notably, the current quarter’s earnings news and the firm’s guidance choices in the prior quarter. The evidence of a link between run-ups in volatility and guidance is consistent with either (1) the market anticipating the act of bundling (and its associated impact on prices) or (2) managers reacting to the rising volatility by providing guidance.

We attempt to distinguish between these two explanations for our findings by focusing on investors’ ability to forecast bundling (the first explanation). Examining firms which guided within the past 12 quarters, we find that the majority of firms do not guide every quarter. Of the

47,168 firm-quarter observations where managers have recently (last 12 quarters) guided, only 50% guided in the same quarter of the prior year and approximately 25% either remained silent or offered a single forecast in the past 4 quarters. This guiding irregularity indicates that investors cannot perfectly anticipate the guidance. Importantly, when we relate the likelihood of a firm providing guidance and the volatility run-up prior to earnings announcement, we find a very low correlation, questioning the validity of the first explanation above (that the volatility run-up is in anticipation of the guidance). Furthermore, when we limit our analysis to recent guiders (i.e., focusing on variation in guidance behavior while attempting to limit variation in the extent to which the market anticipates the presence of a forecast), we again detect a link between recent run-ups in volatility and managers' propensity to bundle in the current quarter. Thus, consistent with managers' claim that they guide to suppress volatility, we find that the choice to bundle in a particular quarter is indeed related to recent spike in volatility for firms committed to guidance.

If a volatility runup leads managers to issue guidance, the next question is: is the guidance effective in arresting volatility? Examining movement in volatility on the day of the earnings announcement and in the days immediately thereafter, we find a significant decrease in volatility for the guiders. Regardless of the nature of the forecast news, positive or negative, and controlling for both the earnings news released and the pre-announcement run-up in volatility (as well as other factors), we detect no difference in volatility movement on the day of the earnings announcement when we compare bundled quarters to non-bundled quarters. Hence, we definitely don't find evidence that guidance increases volatility. Further, in the subsequent trading days, our evidence indicates that the bundling of earnings guidance with the regular announcement of

earnings is associated with a greater post-announcement reduction in volatility, than for non-bundled earnings. Our findings thus contradict the guidance naysayers.

The remainder of this paper progresses as follows. Section 2 reviews the relevant literature and presents our predictions. Section 3 discusses our approach to sample selection and our empirical methods. Section 4 presents the descriptive statistics and empirical results of the study. Finally, Section 5 concludes with a summary and discussion.

## **2. Related Literature and Hypotheses**

Investor uncertainty and, by extension, stock price volatility fluctuate considerably around earnings-relevant information releases. Patell and Wolfson (1976, 1981) document that option implied volatility increases in the days leading up to quarterly earnings announcements and collapses thereafter. Focusing attention on “unbundled” management forecasts (i.e., earnings guidance issued apart from the regular announcement of earnings), Rogers, Skinner and Van Buskirk (2009) also observe a rise in volatility prior to guidance, but, in contrast to Patell and Wolfson, report that volatility remains elevated in the post-guidance days and conclude that these forecasts increase short-term volatility. Those unbundled guidances, however, are now rare—nearly one third of all recent earnings announcements bundle the release of current quarter results with forward-looking guidance (Anilowski, Feng and Skinner 2007; Rogers and Van Buskirk 2012)—leading us to focus on bundled guidance. We ask: Does the pre-earnings-announcement spike in the level of volatility, trigger managers’ decisions to guide in a particular quarter? Furthermore, we ask, does the post-earnings-announcement decrease in volatility differ depending upon the presence or absence of guidance?



Prior work indicates that managers tend to disclose more when earnings are less volatile (Waymire 1985) and easier to predict (Chen, Matsumoto, and Rajgopal 2011). Consistent with this notion, Cotter, Tuna, and Wysocki (2006) find that “management guidance is more likely when ... analysts’ forecast dispersion is low.” Similarly, Houston, Lev, and Tucker (2010) argue that forecast dispersion reflects greater difficulty in predicting earnings and, accordingly, document a positive relation between increased dispersion and the likelihood that a manager stops guiding. Collectively, these studies indicate that managers will be less likely to bundle a forecast with the firm’s earnings announcement when pre-announcement levels of volatility are high, which leads us to our first hypothesis:

**H1: High pPreannouncement levels of share volatility are associated with a decreased likelihood of bundling guidance with earnings.**

At the same time, survey evidence suggests that managers guide with an aim toward dampening share price volatility (Graham, Harvey, and Rajgopal 2005; McKinsey survey 2006). Indeed, executives frequently indicate that they commit to guidance in order to constrain the volatility in their stock (Johnson 2009; National Investor Relations Institute 2009). This suggests that a pre-announcement rises in volatility will trigger managers to provide guidance in an effort to dampen the rising volatility.

**H2: Preannouncement rises in share volatility are associated with an increased likelihood of bundling guidance with earnings.**

Shifting attention from the role of pre-announcement volatility increase to the consequences of guidance, we note that prior evidence suggests that guidance may not achieve managers’ intentions. Early work by Bushee and Noe (2000) links improvements in disclosure with increased stock volatility, while more recent work links guidance with increased volatility and heightened crash risk (Rogers, Skinner and Van Buskirk 2009; Hamm, Li and Ng 2012).

Other work suggests that opportunistic managers provide guidance in order to foster uncertainty (So 2012). Collectively, these studies suggest that guidance not only fails to decrease volatility, but may actually increase it. Thus, the decision to bundle might actually slow down the previously documented decrease in volatility in the days immediately following the announcement of earnings (Patell and Wolfson 1976, 1981). Thus,

**H3: The post-earnings-announcement decrease in volatility is slowed down by the presence of a guidance.**

### **3. Data**

We begin our data collection by obtaining the report date of quarterly earnings (RDQ) for all firm quarters in Compustat for the period of 2001 through the end of 2010. To these firm-quarter observations, we add guidance data from First Call's Company Issued Guidelines files. We code a variable (GUIDANCE) to indicate when a management forecast occurs during the 5 trading days centered on the earnings announcement. We also code a number of indicator variables that reflect the firm's guidance history prior to the current quarter's earnings announcement: GUIDE\_CQTR reflects whether the firm previously provided guidance for the current quarter's earnings, while GUIDE\_PRIOR reflects whether the firm bundled earnings guidance with the prior quarter's earnings announcement. Expanding the focus from just the prior quarter, we code two additional indicator variables that aim to capture managers' willingness to use guidance to communicate with the market in the past: GUIDE\_HISTORY equals one for firms with at least one earnings guidance prior to the current quarter's earnings announcement; while SILENT\_12Q equals one for firms with no earnings guidance in their history for at least the past 12 quarters.

Next, we collect analyst forecast data from I/B/E/S using the unadjusted detail file three days prior to each earnings announcement. From this file, we derive the consensus analyst forecast (typically the median), the standard deviation of analyst forecasts, and the number of analyst forecasts conditional on the analyst forecast being no more than 90 days old (i.e., non-stale). The median analyst forecast, combined with the actual earnings for a given quarter, provides a history of earnings surprises. Specifically we measure each quarter's surprise (SURPRISE) as the reported actual earnings (obtained from Compustat quarterly files) minus the most recent median analyst estimates, deflated by stock price 3 trading days prior to the earnings release date. The dollar earnings surprise (actual earnings minus the median analyst forecast) is divided by the stock price three days prior to the earnings release to create a Standardized Unexpected Earnings (SUE).

In addition to actual and forecasted earnings information, we collect share price, return, number of shares and volume data from the Center for Research in Security Prices (CRSP) database. We use these data to compute the market value of a firm's equity each quarter, the 90-day return ending three days prior to the earnings release date, and the standard deviation of actual returns over that 90-day period.

Finally, we gather close-of-day implied volatility data from Option Metrics. Specifically, we collect implied volatilities on 30-day standardized at-the-money options during 15 days before and after each earnings date. This allows us to determine an average level of implied volatility in the days before quarterly earnings release and the changes in implied volatility over various time periods before and after quarterly earnings releases. We also collect closing levels of the Chicago Board Option's Exchange volatility index (VIX) from their website during the

three-day window centered on an earnings date. We define all the variables used in our analyses in the Appendix.

#### **4. Our Findings**

This section reports the results of our two-pronged investigation: the association between pre-announcement changes in volatility and the decision to bundle guidance with earnings releases and the association between post-announcement changes in volatility and the existence of guidance in the earnings release. First, we provide a statistical description of the data.

##### ***Descriptive Statistics***

Table 1 summarizes the descriptive statistics of relevant variables for the 107,307 sample observations. Panel A provides unconditional statistics, while Panel B conditions the data on whether the earnings announcement is or is not associated with management guidance.

[Insert Table 1.]

Notably, almost 31% of quarterly earnings announcements are bundled with guidance. There is a certain consistency in guidance behavior, since 31% of the earning announcements also had guidance bundled with the prior quarter's earnings announcements, and about 27% of this quarter's earnings releases were the subject of prior managerial forecasts. Conversely, 56% of earnings announcements have no management guidance in the previous twelve quarters. Of 56% of earnings reports released following at least 12 quarters without guidance, only 3% (not tabulated in Table 1) bundle guidance with earnings. Thus, while there is some consistency in the practice of guidance, it is far from perfect.

The mean (median) SUE for the sample firms is -0.006 (0.000), and twenty percent of the earnings announcements are losses. About 58% of earnings announcements exceed the median

analyst forecast by an SUE of at least +0.0001, whereas 31% of the actuals fall below the median analyst forecast of -0.0001, leaving about 11% of earnings exactly meeting the analysts' consensus forecast. This bias toward "beats" is consistent with prior research.

Examining Panel B, we find statistically significant differences between the means and medians of the bundled and non-bundled earnings announcements for all the variables tabulated. Specifically, managements issuing positive earnings news (both current and past)—surprise variable—are more likely to bundle guidance with the earnings release than managements of firms with less favorable earnings news. Guiders tend to have greater market capitalizations and are more widely followed by analysts than non-guiders. There also tends to be less disagreement among analysts following firms that guide than those that do not guide, suggesting that guidance reduces investors' uncertainty. Interestingly, firms that do not guide are associated with larger pre-announcement stock price increases than firms that do guide. Combined with the fact that non-guiders are more likely to disappoint with the earnings announcement, the larger stock price run-up prior to the earnings release exaggerate the disappointment. Table 2 provides the correlations among the examined variables.

Table 3 provides descriptive statistics for the volatility measures we use in our analyses. Because listed options exist only for a sub-sample of firms, we have only 72,123 observations (out of a total of \_\_\_\_ ) after requiring Option Metrics data.

[Insert Table 2.]

On average, the realized stock price volatility (standard deviation of daily returns), **svol\_level**, in the 90 days prior to the earnings announcement, is 3% per day, or about 47.6% annualized (assuming identically and independently distributed returns) to 252 trading days in a year. implied volatility, **ivol\_level**, on average, is 49%. As noted in prior literature, implied volatility

risks in the days prior to an earnings announcement (by 1.8% over three days and 3.1% over 15 days, on average) and falls substantially on the earnings announcement day (2.5% on average) and the immediately following days (by over 6%).

From Panel B of Table 3, we find that firms choosing to bundle guidance with earnings announcements tend to have lower *levels* of volatility (measured by either realized or implied volatility, by means or medians), but larger *increases* in volatility immediately prior to the earnings release. The first result is consistent with prior work (see, Waymire (1985) and Bozanic, Roulstone, and Van Buskirk (2012)). The larger volatility increase prior to earnings announcements of guiders (0.042 vs. 0.023, for guiders and non-guiders, respectively, for the 15 days prior to earnings release,  $\Delta ivol\_pre15d$ ) suggests that the decision to guide is related to the volatility increase; a finding not reported earlier. We also document (see  $\Delta ivol\_post$ ) significantly larger decreases in volatility post-earnings-announcement for guiding firms (around 11%, consisting of 2.8% on the earnings announcement day and over 8% in the days thereafter) than for earnings announcements not accompanied by guidance (less than 8%). On average, firm-quarters with bundled earnings-guidance, are associated with a more negative net change in implied volatility (measured either from three or 15 days before the earnings release dates to three or 15 days afterwards) than for firms without earnings guidance. For example, the mean seven-day net change in volatility from three days before the announcement through three days afterwards is -5.8% for non-guiders and -7.2 for guiders (the difference is statistically significant).

It may be argued that the higher pre-announcement increase in volatility for guiders reflect investors' expectation of the release of guidance. But in Panel C of Table 3, we note that the volatility differences hold even when we focus our attention on firms for which investors

may expect a guidance. For this analysis, we use the 48,168 observations where the firm provided guidance at least once in the prior twelve quarters. We find that such firms, all with a recent history of guiding, are less likely to guide in a given quarter if the level of realized or implied volatility is high, and more likely to guide if there is a larger increase in implied volatility in the days immediately prior to the earnings announcement. Likewise, the post-announcement volatility decrease is greater and the 7- or 31-day net change in implied volatility is larger for guiders than for non-guiders. It thus appears that guidance is a response to a volatility spike.

Finally, in Panel D of Table 3, we condition the statistics on the sign of the earnings news (negative announcements are those with a  $SUE < -0.0001$ , and positive with a  $SUE > +0.0001$ ). We note that regardless of the earnings news, firm-quarters with higher levels of volatility are less likely to guide, while firms with greater increases in pre-announcement volatility are more likely to guide, and firm-quarters with guidance are associated with larger decreases in post-release volatility (and more negative net volatility changes) than firm-quarters without guidance. Thus, the specific earnings message doesn't affect our main findings. Nor does the guidance message, as seen in Table 4. For each state of earnings (negative, neutral, and positive), we disaggregate the guidance to negative, neutral, and positive, relative to the consensus forecast for the guided quarter. First thing to note is that the majority of guidance cases for each earnings message are negative (warnings). Regarding our major finding—that guidance is associated with a volatility spike before the earnings announcement—it holds for each of the three types of guidance. Specifically, for each of the three guidance messages, the pre-announcement volatility increases ( $\Delta ivol\_pre15d$  and  $\Delta ivol\_pre3d$ , for 15 and 3 days prior to announcement) are larger than the volatility increases of the unbundled (no-guidance) cases (the only exception: positive

earnings and positive guidance, 15 days prior). Also, without exception, the post-earnings announcement volatility decreases, both over three and 15 days, are larger for negative, neutral and positive guidance, than non-guided earnings releases. Thus, we find consistent regularities: the observed volatility changes from before to after the earnings release are unaffected by the earnings or the guidance message. We now turn to a multivariate analysis.

### ***What Affects the Decision to Guide?***

We begin by investigating the decision of managers to bundle guidance with an earnings announcement. Based on prior research<sup>1</sup>, we anticipate that this decision is influenced by past guidance practice, and the information environment of the firm. To control for past guidance practice, we create a binary variable that takes a value of one if management issued guidance concerning the prior quarter's earnings and another binary variable taking a value of one if management issued guidance during the current quarter. We expect that both of these variables are positively correlated with the decision to bundle guidance for future quarter(s) with the current quarter's earnings announcement. That is, we expect that guiding firms tend to continue to guide and that non-guiders tend to not guide.

Management's guidance decision might also be related to the message of the current quarter's earnings. To increase the credibility of a positive earnings surprise, manager may bundle the earnings news with guidance, whereas negative earnings surprises often lead managers to curtail guidance (Houston, Lev, and Tucker, 2010). Using the Standardized

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<sup>1</sup> For example, Houston, Lev, and Tucker (2010), Tang (2011), and Chen, Matsumoto, and Rajgopal (2011) study the decision by managers to cease giving earnings guidance and find roles for guidance history, current and past earnings, the firm's information environment measured by firm characteristics and financial analyst coverage variables, and own realized volatility levels. Kim, Pandit and Wasley (2012) demonstrate the importance to control for market-wide volatility.



Unexpected Earnings as our measure of earnings surprise, we denote SUE values less than -0.0001 as negative surprises, values between -0.0001 and 0.0001 as no surprise, and values exceeding 0.0001 as positive surprises. We create two binary variables, one that identifies negative surprises and one that identifies positive surprises. Prior literature finds that losses are treated differently by the market, so we create a binary variable to identify instances where the firm-quarter's actual earnings number is less than zero. We also look back four quarters to create a history of the firm's earnings performance relative to expectations by computing the proportion of the last four quarters in which the firm's SUE exceeded -0.0001, i.e., the fraction of quarters where the firm met or beat analyst expectations. Finally, we control for the size of the earnings surprise by taking the absolute value of the SUE.

We characterize the information environment of the firm by several variables: The log of the market capitalization is included, as large firms have a richer information environment than small firms. The log of the number of analyst estimates and the standard deviation of those estimates are also included as information variables. These variables represent the amount of private information generation about a firm and the apparent agreement (forecast dispersion) with regard to that private information. To address possible information leakage prior to the earnings announcements, we include the return on the firm's stock during the 90 days prior to announcement (roughly since the last earnings announcement).

Lastly, we reflect in the regression the association between share volatility and the decision to guide. Postulating both a levels effect and an effect of changes in volatility, we formulate two variables. For the levels variables, we compute the standard deviation of daily returns during the 90 days prior to the earnings announcement (ending three days prior), and use the implied daily volatility from a standardized 30-day at-the-money option from 15 days before

the earnings announcement through 15 days after the announcement. We focus on standardized 30-day implied volatilities from Option Metrics as they provide the best high frequency measure of the market's assessment of stock price volatility. To isolate firm-specific volatility effects, we also control for the level of market-wide volatility, using the volatility index (VIX).

We estimate the following regression with year and industry fixed effects,

$$\begin{aligned} \text{Guide} = & \alpha + \beta_1(\text{guide\_current\_quarter}) + \beta_2(\text{guide\_prior\_quarter}) + \beta_3(\text{positive\_surprise}) + \\ & \beta_4(\text{negative\_surprise}) + \beta_5(\text{absolute\_surprise}) + \beta_6(\text{loss}) + \beta_7(\text{forecast\_dispersion}) + \\ & \beta_8(\text{prior\_returns}) + \beta_9(\text{log\_market\_value\_equity}) + \beta_{10}(\text{log\_number\_of\_estimates}) + \\ & \beta_{11}(\text{proportion\_meet\_or\_beat}) + \varepsilon, \end{aligned} \quad (1)$$

where:

Guide = 1 if the current quarter's earnings release is bundled with guidance for future quarters and 0 otherwise,

guide\_current\_quarter = 1 if the firm guided with respect to the current quarter in the past and 0 otherwise,

guide\_prior\_quarter = 1 if the firm provided a bundled earnings announcement in the prior quarter and 0 otherwise,

positive\_surprise = 1 if the SUE > 0.0001 and 0 otherwise;

negative\_surprise = 1 if the SUE < -0.0001 and 0 otherwise;

absolute\_surprise = the absolute value of the SUE;

loss = 1 if the current quarter's earnings are negative and 0 otherwise;

forecast\_dispersion = the standard deviation of the individual analyst forecasts existing at the time of the earnings release;

prior\_return = the return on the stock in the 90 days prior to the earnings announcement ending three days prior to the earnings release;

log\_market\_value\_equity = log(share price three days prior to the earnings \* shares outstanding);

log\_number\_of\_estimates = log(number of individual analyst estimates existing at the time of the earnings announcement); and

proportion\_meet\_or\_beat = the fraction of the prior four quarters in which the firm's SUE exceeded -0.0001.

We then add variables measuring the volatility level, pre-release changes in volatility and variables intended to focus our attention on the subsample of firms most likely to respond to volatility dynamics around earnings releases with earnings guidance. All variable values are Winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentile values.

Estimates of regression (1) are reported in Table 5. We report six specifications of the regression.

[Insert Table 5.]

Initial regression estimations use all the 107,307 sample firm-quarters. When we add implied volatility levels from Option Metrics, our sample size decreases to 72,123 firm-quarters as not all firms have traded options. Of these, 27,046 firm quarters include earnings guidance.

In column (1) of Table 5, we find that the majority of our predicted associations are confirmed. Specifically, guidance history is positively correlated with the decision to include guidance with the current quarter's earnings; the coefficient estimates on `guide_cqtr` and `bundled_prior` are reliably positive. The direction and magnitude of the current quarter's earnings news also matters. Managers are more likely to guide if the current and past quarters' earnings news beats analysts' forecasts and are (weakly) less likely to bundle if the earnings miss the consensus. The negative earnings news result is reliably negative only if the firm reports a loss. For large surprises in either direction ( $|\text{surprise}|$ ), managers are less likely to guide. Managers are more likely to include a guidance with earnings if the firm has a larger market capitalization (consistent with the increased frequency of bundlers for the Option Metrics subsample); when the firm is followed by more analysts; or when the analysts are in more

agreement. The general picture emerging is that guidance is associated with more informed and transparent information environment. Which is the cause and which is the effect is yet to be determined.

In columns (2) and (3) of Table 5, we control for market volatility (measured with VIX) and add the level of individual stock price volatility, measured as the realized volatility in column (2) and the implied volatility in column (3), to the previously included variables. Specifically,

svol\_level = the level of stock price volatility, is measured as the standard deviation of stock prices in the 90 days prior to the earnings announcement (ending three days prior) or, alternatively, the average implied volatility, ivol\_level, on the standardized 30-day option on the stock in the three day period, and alternatively over a 15-day period prior to the earnings announcement.

Regardless of whether we measure volatility with share volatility (column (2)) or implied volatility (column (3)), as the level of volatility increases, firms are less likely to provide guidance. This is consistent with the hypothesis that managements decline to guide in situations that are particularly difficult to forecast. Using realized volatility, the previously documented results are maintained. With implied volatility as our measure of stock price volatility, the number of analysts variable loses statistical significance in explaining the decision to bundle. Adding the level of volatility to the regression specification adds only marginally to the explanatory power of the model.

In columns (4) and (5) of Table 5, we investigate the effect of the pre-earnings-announcement change in implied volatility on the decision to bundle. We anticipate that bundling is more highly associated with rising levels of pre-earnings volatility, particularly for

firms with a history of guiding, than for firms that do not guide. This may reflect be a management reaction to the rising volatility or it might be a market anticipation of receiving both actual earnings and guidance as to future earnings for the guiding firms. The guiding history is determined by whether firms have or have not guided in the past twelve quarters. Specifically, we define a variable,

$\text{silent\_12q} = 1$  if the firm has not issued guidance in any of the twelve quarters preceding the quarter of interest.<sup>2</sup> This guidance history variable is interacted with the change in implied volatility prior to the earnings announcement.

The estimates in columns 4 and 5 show that the pre-announcement increase in volatility,  $\Delta\text{ivol\_pre}$ , is positively associated with the likelihood of guidance, regardless of whether we measure the volatility run-up over three or 15 days. Moreover, this association is confined to firms with a recent history of guidance, since when the pre-announcement volatility change is interacted with  $\text{silent\_12q}$ , we find a negative coefficient estimate of sufficient magnitude to swamp the positive coefficient estimate on the volatility run-up. That is, rising pre-announcement volatility is associated with an increased likelihood of guidance overall, but is associated with a decreased likelihood of guidance for those firms that have not guided in the recent past. Not surprisingly, the main effect on  $\text{silent\_12q}$  is negative; firms that have not provided guidance before are less likely to provide it now. The addition of the pre-announcement implied volatility change does improve the explanatory power of the model, with the pseudo- $R^2$  rising from less than .64 to over .67. That represents a modest improvement, but most of the explanatory power is provided by past bundling behavior.

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<sup>2</sup> We construct similar variables for eight and four quarters of silence. Conclusions are not sensitive to which variable we use to measure “recent” guider.

It may be argued that the decision to guide is endogenous and that guiding and non-guiding firms are inherently different and should not be combined in a single regression. Accordingly, in column (6), we analyze only firms that have provided guidance at least once in the three years prior to the quarter of interest (i.e.,  $\text{silent\_12q} = 0$ ). This reduces our sample size to 47,168. Given that we are focusing here on firms with a recent guidance history, we no longer use the “silent” variable to distinguish between firms with a guiding history and those without such a history. Notably, our results are maintained; the likelihood of bundling is negatively associated with the level of volatility and positively associated with pre-announcement changes in volatility.

In summary, after controlling for various variables found in prior research to influence the decision by management to bundle earnings guidance with quarterly earnings releases, we find that increases in volatility prior to the earnings announcement are positively associated with guidance. This might be due either to managers trying to mitigate the volatility spike by guidance, or the market anticipating additional volatility associated with a management forecast in the upcoming earnings release. However, the fact that this association is observed when narrowing the sample to only those firms with a recent history of guidance (column 6), and, therefore, firms that the market could anticipate guiding, is more consistent with the first explanation above, namely, that guidance is a response to a volatility runup. We now move from the pre-earnings release period to the post-release period.

### ***The Change in Implied Volatility on the Earnings Announcement Day***

First, we examine the change in implied volatility on the day the earnings are announced. Of primary interest to our investigation is whether firm-quarters with bundled earnings-guidance

differ systematically in the volatility change from firm-quarters without guidance. Therefore, we include the binary variable *bundled*, the dependent variable in our prior analysis, as an explanatory variable in the current analysis, and designate the volatility change on the announcement day as the dependent variable. In addition to noting whether the current-quarter earnings announcement contained guidance for future quarters or not, we suspect that the earnings-day change in volatility depends on the earnings news, the forecast news, the releasing firm's information environment, and the prior level of volatility. To measure the surprise in the announced earnings, we use the absolute value of the SUE. To further study the bundled earnings announcement, we use the First Call/CIG categorization of the forecast news to create binary variables that designate positive, neutral and negative news.<sup>3</sup> The firm's information environment is proxied by the number of analysts providing earnings forecasts, the dispersion of the consensus analyst forecast, and the equity market capitalization of the firm. We also control for the market-wide volatility effects by including the VIX index level and the change in the VIX in the days prior to the earnings release. In order to estimate the effect of own-firm volatility on the magnitude of the announcement-day change in volatility we employ the average level of the 30-day standardized option implied volatility in the five trading days prior to the earnings announcement. Thus, we estimate the following regression equation:

$$\Delta \text{ivol\_rdq} = \alpha + \beta_1(\text{surprise}) + \beta_2(\text{guidance}) + \beta_3(\log \text{mve}) + \beta_4(\log \text{numest}) + \beta_5(\text{dispersion}) + \beta_6(\log \Delta \text{vix}) + \beta_7(\text{VIX\_level}) + \beta_8(\text{ivol\_level}) + \beta_9(\Delta \text{ivol\_pre3d}) + \varepsilon, \quad (2)$$

where:

$\Delta \text{ivol\_rdq}$  = the percentage change in implied volatility from the close of trading one day prior to the earnings announcement through the close of trading the day of the announcement;

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<sup>3</sup> Results are robust to using the Rogers and Van Buskirk (2012) methodology to categorize forecast news conditional on the news contained in earnings.

surprise = the absolute value of the actual quarterly earnings less the median non-stale analyst earnings forecast divided by the stock price three days before the earnings release (i.e.,  $|SUE|$ );

guidance = a binary variable taking on a value of 1 if the firm issued earnings guidance for a future quarter with two days of the quarterly earnings release;

$\log(\text{mve})$  = the natural log of the market capitalization of the firm;

$\log(\text{numest})$  = the natural log of the number of analysts providing non-stale forecasts (note that this must be at least two to produce a standard deviation);

dispersion = the standard deviation of non-stale analyst earnings forecasts three days before the earnings release (implying that a firm-quarter must have at least two non-stale analysts' forecasts);

$\text{VIX\_level}$  = the Chicago Board Options Exchange VIX (implied volatility of the S&P500 Index) the day of the earnings release;

$\log(\Delta\text{VIX})$  = the percent change in the VIX measured one day after the earnings release relative to one day prior to the earnings release.

$\text{ivol\_level}$  = the average of the implied volatility for a standardized 30-day at-the-money option in the five days prior to an earnings release; and

$\Delta\text{ivol\_pre3d}$  = the percent change in the implied volatility for a standardized 30-day at-the-money option in the three days prior to an earnings release (results are robust to using the 15-day change).

Fixed effects for year and industry classification (two-digit SICs) also are included in the regression.

Of particular interest is the sign of the estimated guidance regression coefficient,  $\beta_2$ . If earnings guidance triggers a volatility increase, as suggested by certain recent research, we would expect a positive and significant  $\beta_2$  coefficient. (Note that the prior evidence on guiding increasing volatility refer to the minority of guidances not released with earnings announcements.) However, as made clear by the estimates reported in Table 6, the  $\beta_2$  coefficient is statistically insignificant for negative, neutral, and positive earnings news. We thus don't find



any evidence indicating that guidance enhances share volatility relative to unguided earnings announcements on the earnings announcement day.

[Insert Table 6.]

We further find in Table 6 that higher levels of pre-announcement volatility and higher pre-announcement run-ups in volatility are associated with larger decreases in announcement-day volatility, – most likely indicating that earnings announcements relieve more volatility when the market is most uncertain about earnings. Most of the coefficient estimates on the control variables in Table 6 have signs consistent with our expectations.

To further explore the impact of guidance on the announcement day volatility we examine whether differences can be detected between the guidance conveying positive, neutral, or negative news. We find that none of the estimated guidance coefficients are significant at traditional levels, except that associated with neutral forecast news associated with positive earnings news. The positive coefficient in that case suggests that this specific combination of news (out of nine combinations; 4.6% of our sample) is correlated with higher announcement-day volatility. Other than that particular combination, guidance seems to be unrelated to the volatility change on the earnings release day.

### ***The Change in Implied Volatility in the Days Subsequent to the Earnings Announcement***

Table 7 reports on an important phase of this study—the change in volatility in the days following the earnings announcement, with a particular interest in whether earnings releases bundled with guidance are associated with larger declines in volatility than earnings releases without guidance. We estimate an equation similar to equation (2). Here, however, the dependent variable is the percent change in the implied volatility over the three days after the

earnings announcement from the day of the earnings announcement. We include in the regression the earnings day change in implied volatility as a control variable.

[Insert Table 7.]

It is evident from Table 7 that the firm-quarters identified with guidance (regardless of the news contained in the forecast) have larger post-earnings announcement *decreases* in volatility than firm-quarters without guidance. Stated differently, guidance is associated with subsequent lower implied volatility than non-guidance. This result holds after controlling for positive, negative and neutral earnings news, and the change in volatility levels leading up to the earnings release. The clear message is that bundling guidance with earnings announcement is associated with larger decreases in post-earnings announcement volatility than unbundled earnings releases.

## **5. Conclusion**

In this study, we consider the interplay between guidance and volatility. The major reason for this investigation is the tension between managers' claims that a major reason for earnings guidance is to arrest share volatility, and certain recent evidence suggesting that guidance increases volatility. Since currently, the large majority of guidance cases are released with the quarterly earnings announcement, we focus on these bundled earnings-guidance cases. Consistent with the notion that volatility does indeed factor into managers' decisions to supply earnings guidance, we first provide evidence indicating that the bundling of a forecast with the firm's earnings announcement follows a spike in volatility. Thus, a volatility rise prior to the earnings announcement appears to induce managers to provide guidance along with the earnings announcement. And what happens to share volatility after the guidance release? First, in contrast

to certain recent research, we find no evidence that the decision to guide in a given quarter increases volatility. In fact, our evidence indicates that on the day of the earnings release, the volatility of bundled earnings-guidance releases is not higher than that of unbundled announcements, whereas, in the post-announcement days, the volatility decreases of bundled releases is higher than unbundled ones. Consistent with managers' perceptions, guidance appears to arrest share volatility.

Our findings also suggest that firms in more volatile information environments are generally reticent to offer guidance, but given a pre-earnings release spike in volatility, committed guiders are more likely to jump in with a forecast seemingly in an effort to calm the market. Subsequent evidence indicates that managers' efforts do not go unrewarded, as we document greater post-announcement run-downs in volatility for disclosing firms. Taken collectively, this evidence supports the view that managers can and do positively shape their firms' information environments with earnings guidance.

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## Appendix A ■ Variable definitions

We assemble a sample of 107,307 firm-quarter observations for the period of 2001 through 2010 with available Compustat, CRSP, I/B/E/S and First Call data. In tests that require the use of implied volatility data (obtained from the standardized options dataset in OptionMetrics), the sample includes 72,123 firm-quarter observations. We winsorize all continuous firm-quarter observations at the 1% and 99% levels. All regressions include industry fixed effects, which we code based on 2-digit SIC codes.

<b>guidance</b>	An indicator variable set to 1 if the firm provided an earnings forecast during the 5-day window surrounding the report date of quarterly earnings.
<b>negative_fnews</b>	An indicator variable set to 1 if <b>bundled=1</b> and the bundled forecast estimate is less than the pre-forecast prevailing median analyst estimates.
<b>positive_fnews</b>	An indicator variable set to 1 if <b>bundled=1</b> and the bundled forecast estimate is greater than the pre-forecast prevailing median analyst estimates.
<b>neutral_fnews</b>	An indicator variable set to 1 if <b>bundled=1</b> and the bundled forecast estimate is equal to the pre-forecast prevailing median analyst estimates.
<b>cond_fnews</b>	We also code indicator variables based on Rogers and Van Buskirk (2012)’s approach to calculating conditional forecast news. Specifically, <b>negative_cond_fnews</b> ( <b>positive_cond_fnews</b> ) is an indicator variable set to 1 if the forecast news, conditional on expected analyst forecast revisions, is negative (positive).
<b>guide_cqtr</b>	An indicator variable set to 1 if the firm previously provided earnings guidance for the current quarter’s earnings.
<b>guide_history</b>	An indicator variable set to 1 if the firm had supplied at least one piece of earnings guidance in the First Call data prior to the 5-day window surrounding the current quarter’s earnings announcement.
<b>silent_12q</b>	An indicator variable set to 1 if the firm provided no earnings guidance in the prior 12 quarters. (We also consider 4 and 8 quarters in our analyses.)
<b>bundled_prior</b>	An indicator variable set to 1 if the firm issued an earnings forecast during the 5-day window surrounding the report date of quarterly earnings last quarter.
<b>surprise</b>	Actual earnings minus the prevailing median analyst estimates, deflated by stock price 3 trading days prior to the report date of quarterly earnings.
<b>p_surprise</b>	An indicator variable set to 1 if this quarter’s earnings surprise exceeds +0.0001.
<b>n_surprise</b>	An indicator variable set to 1 if this quarter’s earnings surprise falls below -0.0001.
<b>loss</b>	An indicator variable set to 1 if actual earnings is less than 0.
<b>dispersion</b>	The standard deviation of prevailing analyst estimates for the current period’s earnings.
<b>prior_ret</b>	The cumulative stock return over the 90-day period ending 3 trading days prior to the report date of quarterly earnings.
<b>mve</b>	The market value of equity (i.e., price multiplied by shares outstanding) measured 3 trading days prior to the report date of quarterly earnings.
<b>numest</b>	The number of analysts with outstanding estimates 3 trading days prior to the report date of quarterly earnings.
<b>propmb</b>	The proportion of the previous 4 quarters that the firm’s reported earnings met or exceeded analysts’ prevailing median consensus estimates.
<b>svol_level</b>	The standard deviation of daily stock returns over the 90-day period ending 3 trading days prior to the report date of quarterly earnings.
<b>ivol_level</b>	The average level of implied volatility ( <b>ivol</b> ) for a 30-day duration, at-the-money option in the 5 trading days prior to the report date of quarterly earnings.
<b>Δivol_pre15d</b>	The natural logarithm of the ratio of <b>ivol</b> measured at the close of the day prior to the report date of quarterly earnings to <b>ivol</b> measured 15 days prior to the report date of quarterly earnings (i.e., the change in <b>ivol</b> in the 15 days prior to the earnings release).

<b><math>\Delta ivol\_pre3d</math></b>	The natural logarithm of the ratio of <b>ivol</b> measured at the close of the day prior to the report date of quarterly earnings to <b>ivol</b> measured 3 days prior to the report date of quarterly earnings (i.e., the change in ivol in the 3 days prior to the earnings release).
<b><math>\Delta ivol\_rdq</math></b>	The natural logarithm of the ratio of <b>ivol</b> measured at the close of the report date of quarterly earnings to <b>ivol</b> measured at the close of the day prior to the report date of quarterly earnings (i.e., the change in ivol on the day of the earnings release).
<b><math>\Delta ivol\_post3d</math></b>	The natural logarithm of the ratio of <b>ivol</b> measured 3 days after the report date of quarterly earnings to <b>ivol</b> measured as of the close of the report date of quarterly earnings (i.e., the change in ivol in the 3 days following the earnings release).
<b><math>\Delta ivol\_post15d</math></b>	The natural logarithm of the ratio of <b>ivol</b> measured 15 days after the report date of quarterly earnings to <b>ivol</b> measured as of the close of the report date of quarterly earnings (i.e., the change in ivol in the 15 days following the earnings release).
<b>vix_level</b>	The level of the Chicago Board Options Exchange Volatility Index on the report date of quarterly earnings.
<b><math>\Delta vix</math></b>	The natural logarithm of the ratio of <b>vix_level</b> measured 1 day after the earnings announcement to the <b>vix_level</b> measured 1 day prior to the earnings announcement.

**Table 1 ■ Descriptive statistics**

The sample consists of 107,307 firm-quarter observations from 2001 through 2010. Panel A provides descriptive statistics for the full sample, while Panel B provides descriptive statistics for the full sample partitioned based on the presence of an earnings forecast during the 5-day window surrounding the announcement of earnings. In Panel B, **\*\*\*, \*\*, \*** denote instances where the two subsamples differ significantly at the 1%, 5%, and 10% level, respectively, for two-tailed tests. Please refer to the Appendix for variable definitions.

**Panel A: Full sample (n=107,307)**

	Mean	Median	Min	Q1	Q3	Max
<b>bundled</b>	0.307	0	0	0	1	1
<b>silent_12q</b>	0.560	1	0	0	1	1
<b>guide_cqtr</b>	0.269	0	0	0	1	1
<b>bundled_prior</b>	0.310	0	0	0	1	1
<b>surprise</b>	-0.006	0.000	-68.724	-0.001	0.002	7.146
<b>p_surprise</b>	0.581	1	0	0	1	1
<b>n_surprise</b>	0.305	0	0	0	1	1
<b>loss</b>	0.201	0	0	0	0	1
<b>dispersion</b>	0.032	0.014	0.000	0.003	0.034	0.382
<b>prior_ret</b>	0.033	0.040	-0.796	-0.079	0.152	0.851
<b>mve (\$mil)</b>	4.701	0.778	0.001	0.262	2.614	522.711
<b>numest</b>	5.482	4.000	1.000	2.000	7.000	43.000
<b>propmb</b>	0.702	0.750	0.000	0.500	1.000	1.000

**Panel B: Full sample, partitioned based on bundled earnings-guidance**

	No guidance=0 (n=74,397)			Guidance=1 (n=32,910)			Differences	
	Mean	Median	Std. Dev.	Mean	Median	St. Dev.	Mean	Median
<b>silent_12q</b>	0.782	1	0.413	0.061	0	0.239	***	***
<b>guide_cqtr</b>	0.114	0	0.317	0.620	1	0.485	***	***
<b>bundled_prior</b>	0.086	0	0.281	0.816	1	0.388	***	***
<b>surprise</b>	-0.010	0.000	0.379	0.001	0.001	0.034	***	***
<b>p_surprise</b>	0.542	1	0.498	0.671	1	0.470	***	***
<b>n_surprise</b>	0.354	0	0.478	0.194	0	0.395	***	***
<b>loss</b>	0.253	0	0.435	0.083	0	0.277	***	***
<b>dispersion</b>	0.036	0.014	0.064	0.022	0.013	0.036	***	***
<b>prior_ret</b>	0.035	0.040	0.252	0.029	0.039	0.209	***	***
<b>mve</b>	3.775	0.594	15.519	6.796	1.355	21.981	***	***
<b>numest</b>	5.034	3.000	4.989	6.495	5.000	5.314	***	***
<b>propmb</b>	0.655	0.750	0.287	0.808	0.750	0.230	***	***

**Table 2 ■ Correlations**

The sample consists of 107,307 firm-quarter observations from 2001 through 2010. We present Pearson (Spearman) correlations below (above) the diagonal. Please refer to the Appendix for variable definitions.

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]
[1] silent_12q	1	-0.55	-0.76	0.19	0.03	0.01	-0.21	-0.19	-0.25	0.12	0.13	-0.05	-0.03	0.01	0.09	0.09
[2] guide_cqtr	-0.55	1	0.61	-0.21	-0.08	-0.03	0.14	0.15	0.25	-0.03	-0.03	0.03	0.02	0.02	-0.08	-0.09
[3] bundled_prior	-0.76	0.61	1	-0.20	-0.02	-0.01	0.23	0.18	0.26	-0.15	-0.15	0.05	0.03	-0.02	-0.09	-0.08
[4]  surprise	0.12	-0.11	-0.14	1	0.12	0.01	-0.36	-0.21	-0.27	0.32	0.28	-0.06	-0.02	0.00	0.03	0.06
[5] dispersion	0.11	-0.11	-0.11	0.19	1	-0.02	0.31	0.57	-0.05	-0.02	-0.02	-0.03	-0.02	-0.07	0.04	0.05
[6] prior_ret	0.01	-0.04	-0.01	-0.03	-0.03	1	0.06	-0.03	0.00	-0.04	-0.12	-0.07	-0.01	0.02	0.01	0.04
[7] mve	-0.07	0.05	0.08	-0.07	0.04	0.00	1	0.56	0.24	-0.46	-0.55	0.03	0.01	-0.13	-0.02	0.00
[8] numest	-0.15	0.13	0.15	-0.12	0.18	-0.04	0.33	1	0.19	-0.10	-0.12	0.02	0.00	-0.04	-0.07	-0.05
[9] propmb	-0.25	0.25	0.25	-0.22	-0.12	0.00	0.09	0.17	1	-0.10	-0.09	0.04	0.02	0.00	-0.08	-0.08
[10] svol_level	0.12	-0.04	-0.14	0.42	0.09	-0.03	-0.13	-0.08	-0.13	1	0.87	-0.10	-0.06	0.07	-0.01	-0.04
[11] ivol_level	0.13	-0.03	-0.15	0.25	0.06	-0.16	-0.20	-0.09	-0.11	0.76	1	-0.01	-0.06	0.03	-0.06	-0.11
[12] $\Delta$ ivol_pre15d	-0.04	0.02	0.04	-0.03	-0.03	-0.08	0.01	0.01	0.03	-0.09	0.02	1	0.48	-0.25	-0.11	-0.11
[13] $\Delta$ ivol_pre3d	-0.03	0.01	0.03	-0.02	-0.02	-0.01	0.00	0.00	0.01	-0.05	-0.05	0.50	1	-0.26	-0.06	-0.07
[14] $\Delta$ ivol_rdq	0.01	0.01	-0.02	0.02	-0.03	0.01	-0.04	-0.03	0.00	0.04	0.01	-0.32	-0.31	1	-0.38	-0.37
[15] $\Delta$ ivol_post3d	0.08	-0.07	-0.08	0.03	0.04	0.01	0.00	-0.06	-0.06	0.02	-0.04	-0.11	-0.07	-0.44	1	0.65
[16] $\Delta$ ivol_post15d	0.08	-0.09	-0.08	0.03	0.05	0.02	0.01	-0.04	-0.07	-0.01	-0.08	-0.11	-0.07	-0.42	0.67	1



**Table 3 ■ Volatility and earnings news**

The sample consists of 107,307 firm-quarter observations from 2001 through 2010. Panel A provides descriptive statistics for the full sample, while Panel B provides descriptive statistics for the full sample partitioned based on the presence of an earnings forecast during the 5-day window surrounding the announcement of earnings. Panel C provides descriptive statistics for the subsample of observations where firms have supplied bundled guidance at some time during the past 12 quarters, partitioned based on bundled versus non-bundled quarters. Panel D displays the median value for further partitions of the sample based on the sign of earnings news supplied in the earnings release. ♦ denotes instances where availability of OptionMetrics data reduces sample size to 72,123. In Panels B, C and D, \*\*\*, \*\*, \* denote instances where the two subsamples differ significantly at the 1%, 5%, and 10% level, respectively, for two-tailed tests. Please refer to the Appendix for variable definitions.

**Panel A: Full sample (n=107,307)**

	Mean	Median	Q1	Q3
<b>svol_level</b>	0.030	0.025	0.017	0.036
<b>ivol_level♦</b>	0.490	0.442	0.326	0.606
<b>Δivol_pre15d♦</b>	0.030	0.021	-0.061	0.114
<b>Δivol_pre3d♦</b>	0.018	0.012	-0.040	0.072
<b>Δivol_rdq♦</b>	-0.025	-0.018	-0.096	0.047
<b>Δivol_post3d♦</b>	-0.061	-0.044	-0.139	0.027
<b>Δivol_post15d♦</b>	-0.066	-0.059	-0.167	0.038
<b>vix_level</b>	0.223	0.205	0.150	0.254

**Panel B: Full sample, partitioned based on bundledguidance**

	bundledNon-guiding=0 (n=74,397)			bundledGuiding=1 (n=32,910)			Differences	
	Mean	Median	St. Dev.	Mean	Median	St. Dev.	Mean	Median
<b>svol_level</b>	0.032	0.026	0.022	0.026	0.022	0.015	***	***
<b>ivol_level♦</b>	0.514	0.468	0.235	0.448	0.408	0.199	***	***
<b>Δivol_pre15d♦</b>	0.023	0.015	0.190	0.042	0.032	0.162	***	***
<b>Δivol_pre3d♦</b>	0.016	0.010	0.115	0.022	0.017	0.108	***	***
<b>Δivol_rdq♦</b>	-0.023	-0.017	0.167	-0.028	-0.019	0.161	***	***
<b>Δivol_post3d♦</b>	-0.051	-0.037	0.179	-0.080	-0.058	0.174	***	***
<b>Δivol_post15d♦</b>	-0.054	-0.050	0.208	-0.086	-0.073	0.193	***	***
<b>vix_level</b>	0.225	0.207	0.105	0.217	0.198	0.106	***	***

**Panel C: Recent guidance subsample, partitioned based on bundledguidance**

	bundledNon-guiding=0 (n=16,251)			bundledGuiding=1 (n=30,917)			Differences	
	Mean	Median	St. Dev.	Mean	Median	St. Dev.	Mean	Median
<b>svol_level</b>	0.031	0.026	0.020	0.025	0.022	0.014	***	***
<b>ivol_level♦</b>	0.503	0.458	0.232	0.442	0.403	0.195	***	***
<b>Δivol_pre15d♦</b>	0.027	0.018	0.187	0.043	0.033	0.161	***	***
<b>Δivol_pre3d♦</b>	0.019	0.012	0.113	0.023	0.017	0.108	***	***
<b>Δivol_rdq♦</b>	-0.021	-0.013	0.166	-0.029	-0.020	0.161	***	***
<b>Δivol_post3d♦</b>	-0.062	-0.043	0.178	-0.081	-0.059	0.173	***	***
<b>Δivol_post15d♦</b>	-0.071	-0.062	0.208	0.217	0.195	0.108	***	***
<b>vix_level</b>	0.221	0.203	0.098	0.217	0.195	0.108	***	***

**Table 3 ■ Volatility and earnings news (continued)**

**Panel D: Full sample, partitioned based on nature of earnings news**

	<i>Earnings news =</i>								
	Negative ( <i>n</i> =32,701)			Neutral ( <i>n</i> =12,223)			Positive ( <i>n</i> =62,383)		
	Guidingbu ndled=1 ( <i>n</i> =6,387)	Non- guidingbu ndled=0 ( <i>n</i> =26,314)		Guidingbu ndled=1 ( <i>n</i> =4,456)	Non- guidingbu ndled=0 ( <i>n</i> =7,767)		Guidingbu ndled=1 ( <i>n</i> =22,067)	Non- guidingbu ndled=0 ( <i>n</i> =40,316)	
<b>svol_level</b>	0.022	0.028	***	0.022	0.026	***	0.022	0.025	***
<b>ivol_level</b>	0.410	0.490	***	0.408	0.459	***	0.407	0.458	***
<b>Δivol_pre15d<sup>♦</sup></b>	0.029	0.013	***	0.035	0.019	***	0.033	0.016	***
<b>Δivol_pre3d<sup>♦</sup></b>	0.015	0.009	***	0.017	0.011	***	0.017	0.010	***
<b>Δivol_rdq<sup>♦</sup></b>	-0.014	-0.013		-0.012	-0.009	*	-0.022	-0.020	**
<b>Δivol_post3d<sup>♦</sup></b>	-0.047	-0.028	***	-0.051	-0.036	***	-0.063	-0.041	***
<b>Δivol_post15d<sup>♦</sup></b>	-0.064	-0.040	***	-0.073	-0.059	***	-0.076	-0.054	***
<b>vix_level</b>	0.196	0.208	***	0.195	0.205	***	0.199	0.207	***

• **Main take-aways:**

- Volatility differences are definitely present *prior* to the decision to supply a forecast, which suggests volatility may influence the decision to issue a forecast.
- Volatility level appears to enter differently than volatility changes. That is, high general levels of volatility are associated with a propensity to remain quiet (i.e., bundle=0 when svol, ivol or vix levels are higher), while short-term, recent increases in volatility are associated with a propensity to talk with the market (i.e., bundle=1 when Δivol is higher).

• **Other observations:**

- Conditioning on earnings news, we see less of a tendency to bundle forecasts with negative earnings news: 20% (=6,387/32,701) of negative earnings news is bundled with a forecast, while 36% (=4,456/12,223) of neutral and 35% (=22,067/62,383) of positive earnings news is bundled with a forecast.
- Positive earnings news (whether bundled with a forecast or not) appears to receive the biggest drop in ivol on the day of the earnings release, despite experiencing roughly the same ‘run-up’ in ivol in the days leading up to the release (see Δivol\_pre).
- Bundled earnings news (regardless of sign) appears to be associated with bigger ‘run-downs’ in ivol after the release date (see Δivol\_post).

**Table 4 ■ Volatility and forecast news**

The sample consists of 107,307 firm-quarter observations from 2001 through 2010. This table supplies median values of volatility level and changes surrounding the report date of quarterly earnings for the full sample partitioned based on the presence of a bundled forecast and the nature of both the earnings and forecast news. ♦ denotes instances where availability of OptionMetrics data reduces sample size to 72,123. Please refer to the Appendix for variable definitions.

	<i>Earnings news =</i>											
	Negative ( <i>n</i> =32,701)				Neutral ( <i>n</i> =12,223)				Positive ( <i>n</i> =62,383)			
	Guide =1		No-Guide =0		Guide =1		No-Guide =0		Guide =1		No-Guide =0	
<i>Forecast news =</i>	Neg.	Neut.	Pos.	None	Neg.	Neut.	Pos.	None	Neg.	Neut.	Pos.	None
<i>n =</i>	3,940	1,383	1,064	26,314	2,550	1,131	775	7,767	10,724	4,940	6,403	40,316
	12%	4%	3%	81%	21%	9%	6%	64%	17%	8%	10%	65%
<i>svol_level</i>	0.022	0.023	0.020	0.028	0.023	0.024	0.021	0.026	0.022	0.023	0.021	0.025
<i>ivol_level</i> ♦	0.417	0.423	0.369	0.490	0.417	0.416	0.374	0.459	0.411	0.417	0.390	0.458
<i>Δivol_pre15d</i> ♦	0.028	0.029	0.033	0.013	0.035	0.033	0.037	0.019	0.030	0.029	-0.039	0.016
<i>Δivol_pre3d</i> ♦	0.014	0.017	0.013	0.009	0.018	0.017	0.013	0.011	0.016	0.017	0.019	0.010
<i>Δivol_rdq</i> ♦	-0.014	-0.005	-0.022	-0.013	-0.014	-0.008	-0.011	-0.009	-0.023	-0.014	-0.027	-0.020
<i>Δivol_post3d</i> ♦	-0.048	-0.050	-0.044	-0.028	-0.051	-0.053	-0.051	-0.036	-0.065	-0.062	-0.063	-0.041
<i>Δivol_post15d</i> ♦	-0.067	-0.061	-0.054	-0.040	-0.074	-0.074	-0.062	-0.059	-0.077	-0.080	-0.074	-0.054
<i>vix_level</i>	0.201	0.182	0.186	0.208	0.202	0.187	0.190	0.205	0.203	0.193	0.195	0.207

• **Main take-aways:**

- The choice to bundle appears associated with larger run-ups in volatility prior to the earnings announcement (see *Δivol\_pre*), regardless of the sign of earnings or forecast news. This is consistent with both: (1) the market anticipating the bundling (and the additional news and accompanying ‘conversation’ of it) and/or (2) the choice to bundle stemming (at least in part) from managers’ attempts to quiet the recent craziness. That is, firms in more volatile environments are generally reticent to bundle (as evidenced by the higher *ivol* and *svol* levels), but given a recent spike in *ivol*, they appear more likely to jump in.
- At the same time, the choice to bundle is also associated with seemingly larger run-downs in volatility, particularly for the positive/positive earnings/forecast news combination. Nonetheless, *Δivol\_post* is more negative across the board for bundled.
- Taken collectively, the above results are inconsistent with the notion that guidance *causes* volatility to increase. Guidance does not appear to cause additional volatility.

**Table 5 ■ Does volatility affect the likelihood of supplying a forecast?**

The sample consists of 107,307 firm-quarter observations from 2001 through 2010; the availability of OptionMetrics data reduces sample size to 72,123 in some specifications. In specification [4],  $\Delta\text{ivol\_pre} = \Delta\text{ivol\_pre3d}$ . In specifications [5] and [6],  $\Delta\text{ivol\_pre} = \Delta\text{ivol\_pre15d}$ . In specification [6], the sample is limited to observations where firms have supplied bundled guidance at some time during the past 12 quarters. \*\*\*, \*\*, • denote significance at the 1%, 5%, and 10% level, respectively, for two-tailed tests. Please refer to the Appendix for variable definitions

		Dependent variable = bundle. Marginal effect ( <i>p</i> -value below)											
		[1]		[2]		[3]		[4]		[5]		[6]	
<b>uide_cqtr</b>	+	0.083	***	0.084	***	0.085	***	0.055	***	0.055	***	0.071	***
		<.0001		<.0001		<.0001		<.0001		<.0001		<.0001	
<b>undled_prior</b>	+	0.313	***	0.312	***	0.343	***	0.213	***	0.213	***	0.328	***
		<.0001		<.0001		<.0001		<.0001		<.0001		<.0001	
<b>_surprise</b>	+	0.012	***	0.012	***	0.016	***	0.016	***	0.015	***	0.026	***
		<.0001		<.0001		0.001		<.0001		<.0001		<.0001	
<b>_surprise</b>	−	-0.005		-0.006	•	0.002		0.003		0.002		-0.003	
		0.169		0.079		0.693		0.404		0.674		0.702	
<b>urprise </b>	−	-0.470	***	-0.292	***	-0.404	***	-0.634	***	-0.582	***	-0.861	***
		<.0001		0.0003		0.005		<.0001		<.0001		0.0003	
<b>oss</b>	−	-0.051	***	-0.046	***	-0.057	***	-0.051	***	-0.050	***	-0.082	***
		<.0001		<.0001		<.0001		<.0001		<.0001		<.0001	
<b>ispersion</b>	−	-0.200	***	-0.190	***	-0.210	***	-0.158	***	-0.155	***	-0.190	***
		<.0001		<.0001		<.0001		<.0001		<.0001		0.0004	
<b>rior_ret</b>	?	-0.009	**	-0.009	**	-0.027	***	-0.029	***	-0.027	***	-0.061	***
		0.034		0.046		<.0001		<.0001		<.0001		<.0001	
<b>og(mve)</b>	+	0.012	***	0.010	***	0.008	***	0.008	***	0.008	***	0.015	***
		<.0001		<.0001		<.0001		<.0001		<.0001		<.0001	
<b>og(numest)</b>	+	0.005	***	0.007	***	0.003		-0.003	•	-0.002		-0.006	**
		0.001		<.0001		0.299		0.067		0.138		0.036	
<b>ropmb</b>	+	0.055	***	0.056	***	0.059	***	0.051	***	0.049	***	0.061	***
		<.0001		<.0001		<.0001		<.0001		<.0001		<.0001	
<b>ear</b>	?	-0.004	***	-0.004	***	-0.005	***	-0.003	***	0.003	***	-0.005	***
		<.0001		<.0001		<.0001		<.0001		0.001		<.0001	
<b>ivol_level</b>	−			-0.643	***								
				<.0001									
<b>ivol_level</b>	−					-0.049	***	-0.028	***	-0.032	***	-0.106	***
						<.0001		0.0003		<.0001		<.0001	
<b>ivol_pre</b>	+							0.027	**	0.052	***	0.085	***
								0.022		<.0001		<.0001	
<b>ilent_12q</b>	−							-0.198	***	-0.197	***		
								<.0001		<.0001			
<b>ivol_pre</b>	−							-0.059	**	-0.059	***		
<b>ilent_12q</b>	−							0.013		<.0001			
<b>industry controls</b>		Yes		Yes		Yes		Yes		Yes		Yes	
<b>TX controls</b>		No		Yes		Yes		Yes		Yes		Yes	
<b>seudo R<sup>2</sup></b>		107,307		107,307		72,123		72,123		72,123		47,168	
<b>ROC area</b>		63.3%		63.4%		63.9%		67.7%		67.6%		33.8%	
		0.920		0.920		0.916		0.928		0.929		0.795	

**Table 6 ■ What explains changes in volatility on the date of earnings announcements?**

The sample consists of 107,307 firm-quarter observations from 2001 through 2010; the availability of OptionMetrics data reduces sample size to 72,123 in some specifications. ♦ Results are robust to categorizing forecast news based on conditional analyst forecast revisions, as described in Rogers and Van Buskirk (2012). \*\*\*, \*\*, • denote significance at the 1%, 5%, and 10% level, respectively, for two-tailed tests. Please refer to the Appendix for variable definitions.

		Dependent variable = $\Delta \text{ivol\_rdq}$ Coefficient ( <i>p</i> -value below)									
Earnings news =		Negative ( <i>n</i> =32,701)		Neutral ( <i>n</i> =12,223)				Positive ( <i>n</i> =62,383)			
		[1]	[2]	[3]	[4]			[5]	[6]		
Surprise	+	0.142 *** 0.010	0.143 ** 0.010					0.087 0.244	0.092 0.221		
Bundled	?	0.0013 0.385		-0.002 0.539				0.001 0.799			
Negative_fnews♦	?		0.003 0.331		-0.003 0.436				-0.002 0.299		
Positive_fnews♦	?		-0.006 0.279		-0.007 0.261				-0.003 0.277		
Neutral_fnews♦	?		0.008 0.171		0.004 0.452				0.011 *** 0.001		
log(mve)	–	-0.014 *** <.0001	-0.014 *** <.0001	-0.015 *** <.0001	-0.015 *** <.0001			-0.017 *** <.0001	-0.017 *** <.0001		
log(numest)	–	0.001 0.488	0.001 0.492	0.007 *** 0.002	0.007 *** 0.002			0.009 *** <.0001	0.009 *** <.0001		
Dispersion	–	-0.075 *** <.0001	-0.074 *** <.0001	-0.178 *** 0.001	-0.176 *** 0.001			-0.088 *** <.0001	-0.088 *** <.0001		
log( $\Delta \text{vix}$ )	+	0.166 *** <.0001	0.166 *** <.0001	0.130 *** <.0001	0.130 *** <.0001			0.149 *** <.0001	0.149 *** <.0001		
Size	+	0.111 *** <.0001	0.111 *** <.0001	0.099 *** <.0001	0.099 *** <.0001			0.078 *** <.0001	0.076 *** <.0001		
Vol_level	?	-0.091 *** <.0001	-0.091 *** <.0001	-0.071 *** <.0001	-0.072 *** <.0001			-0.083 *** <.0001	-0.084 *** <.0001		
Vol_pre3d	–	-0.471 *** <.0001	-0.471 *** <.0001	-0.420 *** <.0001	-0.420 *** <.0001			-0.452 *** <.0001	-0.452 *** <.0001		
Industry controls		Yes	Yes	Yes	Yes			Yes	Yes		
Adjusted R <sup>2</sup>		13.4%	13.4%	12.2%	12.2%			12.8%	12.8%		

**Main take-away:** The act of bundling earnings news with guidance does not appear to increase volatility on the report date of quarterly earnings.

**Table 7 ■ What explains changes in volatility following earnings announcements?**

The sample consists of 107,307 firm-quarter observations from 2001 through 2010; the availability of OptionMetrics data reduces sample size to 72,123 in some specifications. ♦ Results are robust to categorizing forecast news based on conditional analyst forecast revisions, as described in Rogers and Van Buskirk (2012). \*\*\*, \*\*, • denote significance at the 1%, 5%, and 10% level, respectively, for two-tailed tests. Please refer to the Appendix for variable definitions.

		Dependent variable = $\Delta \text{ivol\_post}$ Coefficient ( <i>p</i> -value below)											
Earnings news =		Negative ( <i>n</i> =32,701)				Neutral ( <i>n</i> =12,223)				Positive ( <i>n</i> =62,383)			
		[1]		[2]		[3]		[4]		[5]		[6]	
Surprise	+	0.189 <.0001	***	0.190 <.0001	***					0.187 0.009	***	0.044 0.541	
Bundled	?	-0.016 <.0001	***			-0.016 <.0001	***			-0.020 <.0001	***		
Negative_fnews <sup>♦</sup>	?			-0.013 <.0001	***			-0.014 0.001	***			-0.019 <.0001	***
Positive_fnews <sup>♦</sup>	?			-0.024 <.0001	***			-0.029 <.0001	***			-0.019 <.0001	***
Neutral_fnews <sup>♦</sup>	?			-0.017 0.002	***			-0.011 0.039	**			-0.012 <.0001	***
g(mve)	–	-0.011 <.0001	***	-0.011 <.0001	***	-0.014 <.0001	***	-0.014 <.0001	***	-0.013 <.0001	***	-0.011 <.0001	***
g(numest)	–	-0.005 0.004	***	-0.005 0.003	***	-0.004 0.039	***	-0.005 0.035	***	-0.009 <.0001	***	-0.009 <.0001	***
Dispersion	–	-0.029 0.100	•	-0.028 0.099	•	-0.113 0.026	***	-0.111 0.030	***	-0.001 0.954		0.014 0.325	
g( $\Delta \text{vix}$ )	+	0.188 <.0001	***	0.188 <.0001	***	0.186 <.0001	***	0.186 <.0001	***	0.182 <.0001	***	0.197 <.0001	***
x	+	0.114 <.0001	***	0.114 <.0001	***	0.185 <.0001	***	0.186 <.0001	***	0.169 <.0001	***	0.157 <.0001	***
ivol_level	?	-0.090 <.0001	***	-0.090 <.0001	***	-0.107 <.0001	***	-0.108 <.0001	***	-0.111 <.0001	***	-0.085 <.0001	***
vol_pre3d	–	-0.374 <.0001	***	-0.374 <.0001	***	-0.357 <.0001	***	-0.357 <.0001	***	-0.360 <.0001	***	-0.264 <.0001	***
vol_rdq	–	-0.557 <.0001	***	-0.557 <.0001	***	-0.557 <.0001	***	-0.558 <.0001	***	-0.592 <.0001	***	-0.607 <.0001	***
Industry controls		Yes		Yes		Yes		Yes		Yes		Yes	
Adjusted R <sup>2</sup>		25.7%		25.7%		26.9%		27.0%		31.5%		33.5%	

**Main Take-away:** The act of bundling earnings news with guidance does not appear to increase volatility in the post-earnings-announcement period – indeed, if anything, the opposite.